

AMENDMENT TO THE CLAIMS:

Please add new claims 444 and 445, cancel claims 267, 291-336, 360-406, 422, 426, 428 and 430, and amend the claims as shown below.

1-242. (Previously cancelled)

243. (Presently amended) [Nanoparticles] A nanoparticle having oligonucleotides attached [to them] thereto, the oligonucleotides comprising at least one type of recognition oligonucleotides, each of the recognition oligonucleotides comprising a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the nanoparticles, the recognition portion having a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide, wherein in the presence of said nucleic acid or said another oligonucleotide and under hybridization conditions, the nanoparticle having oligonucleotides bound thereto forms a complex with said nucleic acid or said another oligonucleotide, the complex having a sharp melting profile and an increased melting temperature, relative to a melting profile and a melting temperature of an analogous complex formed with said nucleic acid or said another oligonucleotide and an unlabeled or fluorophore-labeled oligonucleotide having a sequence identical to the oligonucleotides bound to the nanoparticle, to allow for selective discrimination of one or more nucleotide insertions, deletions, or mismatches in said nucleic acid or said another oligonucleotide under stringent hybridization conditions.

244. (Currently amended) The nanoparticle[s] of Claim 243 wherein the spacer portion has a moiety covalently bound to it, the moiety comprising a functional group through which the spacer portion is bound to the nanoparticles.

245. (Currently amended) The nanoparticle[s] of Claim 243 wherein the spacer portion comprises at least about 10 nucleotides.

246. (Currently amended) The nanoparticle[s] of Claim 245 wherein the spacer portion comprises from about 10 to about 30 nucleotides.

247. (Currently amended) The nanoparticle[s] of Claim 243 wherein the bases of the nucleotides of the spacer portion are all adenines, all thymines, all cytosines, all uracils or all guanines.

248. (Currently amended) The nanoparticle[s] of Claim 243 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 10 picomoles/cm².

249. (Currently amended) The nanoparticle[s] of Claim 248 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 15 picomoles/cm².

250. (Currently amended) The nanoparticle[s] of Claim 249 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of from about 15 picomoles/cm² to about 40 picomoles/cm².

251. (Currently amended) The nanoparticle[s] of Claim 243 wherein the nanoparticles are metal nanoparticles or semiconductor nanoparticles.

252. (Currently amended) The [method] nanoparticles of Claim 251 wherein the nanoparticles are gold nanoparticles.

253. (Currently twice amended) A nanoparticle [Nanoparticles] having oligonucleotides attached to them, the oligonucleotides comprising: (a) at least one type of recognition oligonucleotides, each of the types of recognition oligonucleotides comprising a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide; and (b) a type of diluent oligonucleotides, wherein in the presence of said

nucleic acid or said another oligonucleotide and under hybridization conditions, the nanoparticle having oligonucleotides bound thereto form a complex with said nucleic acid or said another oligonucleotide, the complex having a sharp melting profile and an increased melting temperature, relative to a melting profile and a melting temperature of an analogous complex formed with said nucleic acid or said another oligonucleotide and an unlabeled or fluorophore-labeled oligonucleotide having a sequence identical to the oligonucleotides bound to the nanoparticle, to allow for selective discrimination of one or more nucleotide insertions, deletions, or mismatches in said nucleic acid or said another oligonucleotide under stringent hybridization conditions.

254. (Currently amended) The nanoparticle[s] of Claim 253 wherein, each of the recognition oligonucleotides comprises a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the nanoparticles, the recognition portion having a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide.

255. (Currently amended) The nanoparticle[s] of Claim 254 wherein the spacer portion has a moiety covalently bound to it, the moiety comprising a functional group through which the spacer portion is bound to the nanoparticles.

256. (Currently amended) The nanoparticle[s] of Claim 254 wherein the spacer portion comprises at least about 10 nucleotides.

257. (Currently amended) The nanoparticle[s] of Claim 256 wherein the spacer portion comprises from about 10 to about 30 nucleotides.

258. (Currently amended) The nanoparticle[s] of Claim 254 wherein the bases of the nucleotides of the spacer portion are all adenines, all thymines, all cytosines, all uracils or all guanines.

259. (Currently amended) The nanoparticle[s] of Claim 253 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 10 picomoles/cm².

260. (Currently amended) The nanoparticle[s] of Claim 259 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 15 picomoles/cm².

261. (Currently amended) The nanoparticle[s] of Claim 260 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of from about 15 picomoles/cm² to about 40 picomoles/cm².

262. (Currently amended) The nanoparticle[s] of Claim 254 wherein the diluent oligonucleotides contain about the same number of nucleotides as are contained in the spacer portions of the recognition oligonucleotides.

263. (Currently amended) The nanoparticle[s] of Claim 262 wherein the sequence of the diluent oligonucleotides is the same as that of the spacer portions of the recognition oligonucleotides.

264. (Currently amended) The nanoparticle[s] of Claim 253 wherein the nanoparticles are metal nanoparticles or semiconductor nanoparticles.

265. (Currently amended) The nanoparticle[s] of Claim 264 wherein the nanoparticles are gold nanoparticles.

266. (Previously cancelled)

267. (Currently cancelled)

268-290. (Previously cancelled)

291 – 336. (Currently cancelled)

- 337-359. (Previously cancelled)
- 360-406. (Currently cancelled)
- 407-421. (Previously cancelled)
- 422. (Currently cancelled)
- 423-425. (Previously cancelled)
- 426. (Currently cancelled)
- 427. (Previously cancelled)
- 428. (Currently cancelled)
- 429. (Previously cancelled)
- 430. (Currently cancelled)
- 431. (Previously cancelled)
- 432. (Currently cancelled)

433. (Currently amended) The nanoparticle[s] according to any one of [claims] Claims 243 or 253, wherein the oligonucleotides are attached to the nanoparticle[s] in a stepwise ageing process comprising (i) contacting the oligonucleotides with the nanoparticle[s] in a first aqueous solution for a period of time sufficient to allow some of the oligonucleotides to bind to the nanoparticle[s]; (ii) adding at least one salt to the aqueous solution to create a second aqueous solution; and (iii) contacting the oligonucleotides and nanoparticle[s] in the second aqueous solution for an additional period of time to enable additional oligonucleotides to bind to the nanoparticle[s].

434. (Currently amended) The nanoparticle[s] according to claim 433, wherein the salt solution has an ionic strength sufficient to overcome at least partially the electrostatic attraction or repulsion of the oligonucleotides for the nanoparticle[s] and the electrostatic repulsion of the oligonucleotides for each other.

435. (Currently amended) The nanoparticle[s] of Claim 433 wherein the nanoparticle[s] are] is a metal nanoparticle[s] or a semiconductor nanoparticle[s].

436. (Currently amended) The nanoparticle[s] of Claim 435 wherein the nanoparticle[s] are] is a gold nanoparticle[s].

437. (Currently amended) The nanoparticle[s] of Claim 436 wherein the oligonucleotides include a moiety comprising a functional group which can bind to a nanoparticle.

438. (Currently amended) The nanoparticle[s] of Claim 433 wherein all of the salt is added to the water in a single addition.

439. (Currently amended) The nanoparticle[s] of Claim 433 wherein the salt is added gradually over time.

440. (Currently amended) The nanoparticle[s] of Claim 433 wherein the salt is selected from the group consisting of sodium chloride, magnesium chloride, potassium chloride, ammonium chloride, sodium acetate, ammonium acetate, a combination of two or more of these salts, one of these salts in a phosphate buffer, and a combination of two or more these salts in a phosphate buffer.

441. (Currently amended) The nanoparticle[s] of Claim 440 wherein the salt is sodium chloride in a phosphate buffer.

442. (Currently amended) The nanoparticle[s] of Claim 433 wherein the oligonucleotides are present on a surface of the nanoparticle[s] at a surface density of at least 10 picomoles/cm².

443. (Currently amended) The nanoparticle[s] of Claim 442 wherein the oligonucleotides are present on a surface of the nanoparticle[s] at a surface density of at least 15 picomoles/cm².

444. (Currently amended) The nanoparticle[s] of Claim 443 wherein the oligonucleotides are present on a surface of the nanoparticle[s] at a surface density of from about 15 picomoles/cm² to about 40 picomoles/cm².

445. (New) Nanomaterials or nanostructures composed of nanoparticles according to any one of Claims 243 or 253, the nanoparticles being held together by oligonucleotide connectors.

446. (New) A kit comprising a container holding nanoparticles according to any one of Claims 243 or 253.